WHAT IS CLAIMED IS:

1. A method of making a living tissue construct having a predetermined shape, the method comprising

providing a negative mold having a defined shape;

suspending isolated tissue precursor cells in a hydrogel to form a liquid hydrogel-precursor cell composition;

introducing the liquid hydrogel-precursor cell composition into the mold;

inducing gel formation to solidify the liquid hydrogel-precursor cell composition to form a living tissue construct; and

removing the living tissue construct from the mold after gel formation.

2. The method of claim 1, wherein the tissue precursor cells are chondrocytes, osteocytes, osteoblasts, or adipocytes, or a combination thereof.

3. The method of claim 1, wherein the tissue precursor cells are chondrocytes.

4. The method of claim 1, wherein the hydrogel is selected from the group consisting of alginate, chitosan, pluronic, collagen, and agarose.

5. The method of claim 1, wherein the hydrogel is alginate.

6. The method of claim 5, wherein the alginate concentration is from 0.5% to 8%.

7. The method of claim 5, wherein the alginate concentration is from 1% to 4%.

8. The method of claim 5, wherein the alginate concentration is approximately 2%.

9. The method of claim 1, wherein inducing gel formation comprises contacting the liquid hydrogel with a suitable concentration of a divalent cation.

10. The method of claim 9, wherein the divalent cation is Ca^{++}.

11. The method of claim 10, wherein the suitable concentration of Ca ion is 0.2 g/ml of the liquid hydrogel-precursor cell composition.

12. The method of claim 1, further comprising culturing the tissue precursor cells in the solidified hydrogel for a period of 1 to 30 days.

13. The method of claim 1, wherein the negative mold is prepared using CAD/CAM or rapid prototyping.

14. A method of reconstructing an anatomical feature in a mammal, the method comprising

providing a suitable negative mold having a negative shape of the anatomical feature;

suspending isolated tissue precursor cells in a hydrogel to form a liquid hydrogel-precursor cell composition,

introducing the liquid hydrogel-precursor cell composition into the mold;

inducing gel formation to solidify the liquid hydrogel-precursor cell composition to form a living tissue construct;

removing the tissue construct from the mold after gel formation; and

implanting the tissue construct into the mammal.

15. An injection-molded living tissue construct made by the process of claim 1.

16. A method of reconstructing an anatomical feature in a mammal, the method comprising

obtaining a living tissue construct having the shape of the anatomical feature; and

implanting the tissue construct into the mammal, wherein the construct is prepared by the method of claim 1.

17. The method of claim 1, wherein the living tissue construct is shaped in the form of articular cartilage adjacent a joint, a bone, a portion of a bone, or a bone defect.

18. The method of claim 1, wherein the hydrogel is selected from the group consisting of polysaccharides, proteins, polyphosphazenes, poly(oxyethylene)-poly(oxypropylene) block polymers, poly(oxyethylene)-poly(oxypropylene) block polymers of ethylene diamine, poly(acrylic acids), poly(methacrylic acids), copolymers of acrylic acid and methacrylic acid, poly(vinyl acetate), and sulfonated polymers.

19. The method of claim 1, wherein the tissue precursor cells are selected from the group consisting of epidermal cells, chondrocytes and other cells that form cartilage, macrophages, dermal cells, muscle cells, hair follicles, fibroblasts, organ cells, osteoblasts and other cells that form bone, endothelial cells, mucosal cells, pleural cells, ear canal cells, tympanic membrane cells, peritoneal cells, Schwann cells, corneal epithelial cells, gingiva cells, neural cells, neural stem cells, and tracheal epithelial cells.

20. The method of claim 1, wherein the tissue precursor cells are nervous system neural stem or progenitor cells.